JOINT INTEROPERABILITY AND ENGINEERING ORGANIZATION

GCCS Operations Handbook

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GCCS OPERATIONS HANDBOOK
FOR VERSION 2.1

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1.0 GCCS/C^{4}I MISSIONS AND OVERVIEW

1.1 Scope

This document is an operational overview of the Global Command and Control System (GCCS) Version 2.1. An executive summary level description of GCCS is provided in Sections 1, 3, and 4. Other sections provide more detailed information and point the reader to documentation describing GCCS Version 2.1.

1.2 GCCS Mission

GCCS is a Command and Control (C^2) system supporting the Joint Chiefs of Staff (JCS) and Commanders in Chief (CINCs) in managing military assets. It is a worldwide system comprising several applications providing Command, Control, Communications, Computers and Intelligence (C^4I) support to joint and multinational operations. It supports all missions in all warfighting environments and provides an interoperable, interconnecting framework among the National Command Authorities (NCA) and the operating and support elements of the national military establishment. GCCS is a globally connected, warrior-involved, interoperable, fully integrated C^4I system which is:

- Flexible, endurable, adaptable, maintainable, and meets the dynamic information processing needs of warfighters at all levels.
- Developed with the consideration of warfighter involvement in the modernization process at all times.
- Composed of standardized hardware and software components that lead to modular, portable, and easily maintainable software implementations.
- Integrated into joint exercise systems so that the actual warfighters will be able to train under real conditions.
- Cost effective.

The military missions of the CINCs are decomposed into joint warfighting Mission Areas for purposes of assessment, strategic planning, resource allocation (as in the PPBS cycle), and other purposes.[1] The General Mission Areas are supported by the five General C^4I Function categories shown in Figure 1-1, and these, in turn are supported by eight GCCS Functional Areas.

The CINCs have further decomposed the eight GCCS Functional Areas into specific Operational Functions based on their Military Missions (see Figure 1-2). These Operational Functions have been merged with those of the Services to produce a set of GCCS Core Functions as shown in Figure 1-3. The functions are groupings of operational tasks for which specific tools are needed. GCCS Version 2.1 provides the tools as specific mission applications. Additionally, generic tools such as office automation and teleconferencing are provided to support all the functions.

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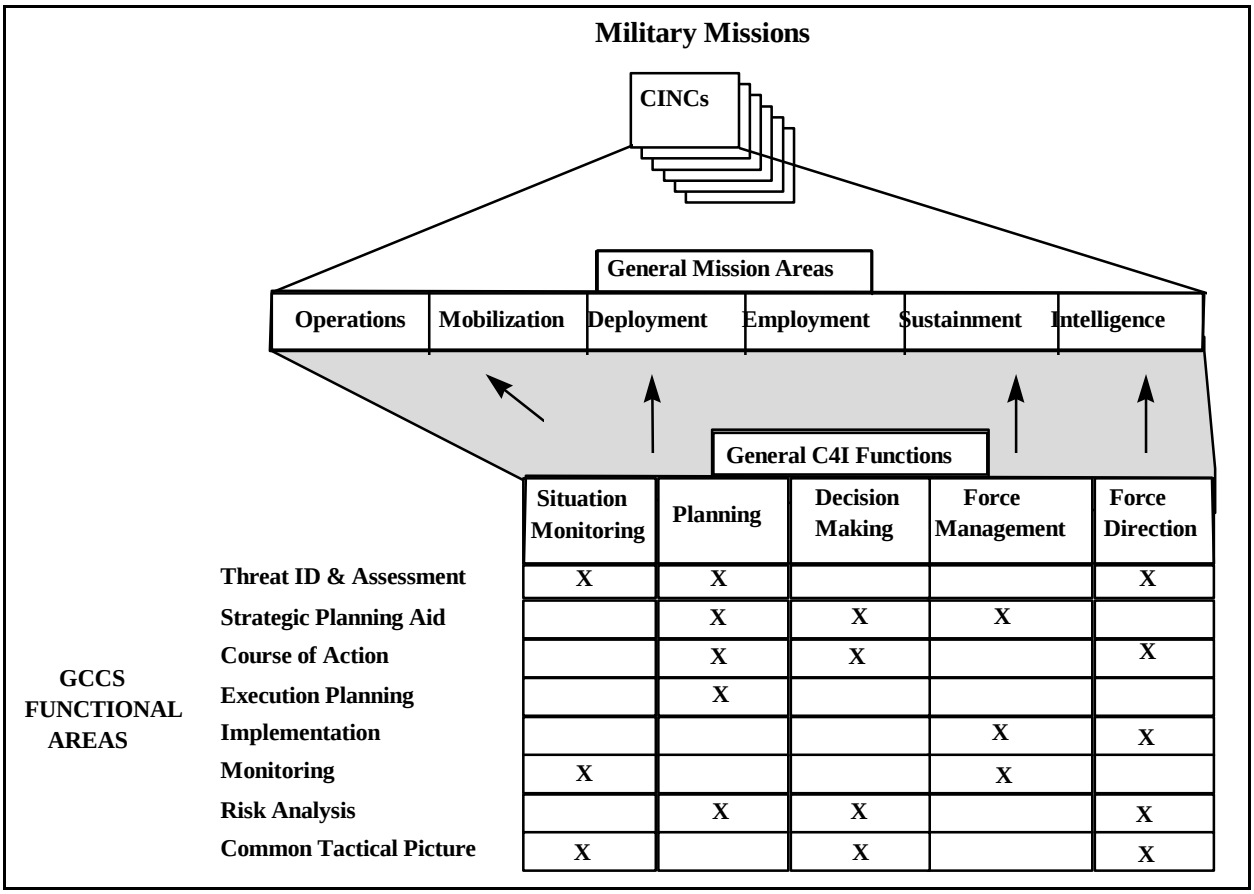
[1] Several different sets of overlapping Mission Area definitions are currently in use.

GCCS Version 2.1 represents the next step in the long-term evolutionary development of GCCS, leading to the final fully capable, state-of-the-art, 21st century C^2 system. GCCS Version 2.1 also achieves a nearer term goal—allowing the shut down of the Worldwide Military Command and Control System (WWMCCS). Shutdown is accomplished by replacing residual key WWMCCS functions with those designed and implemented in modern information systems technologies.



GCCS FUNCTIONAL AREAS	Situation Monitoring	Planning	Decision Making	Force Management	Force Direction
Threat ID & Assessment	X	X			X
Strategic Planning Aid		X	X	X	
Course of Action		X	X		X
Execution Planning		X			
Implementation				X	X
Monitoring	X			X	
Risk Analysis		X	X		X
Common Tactical Picture	X		X		X

Figure 1-1. Missions and GCCS Functional Areas

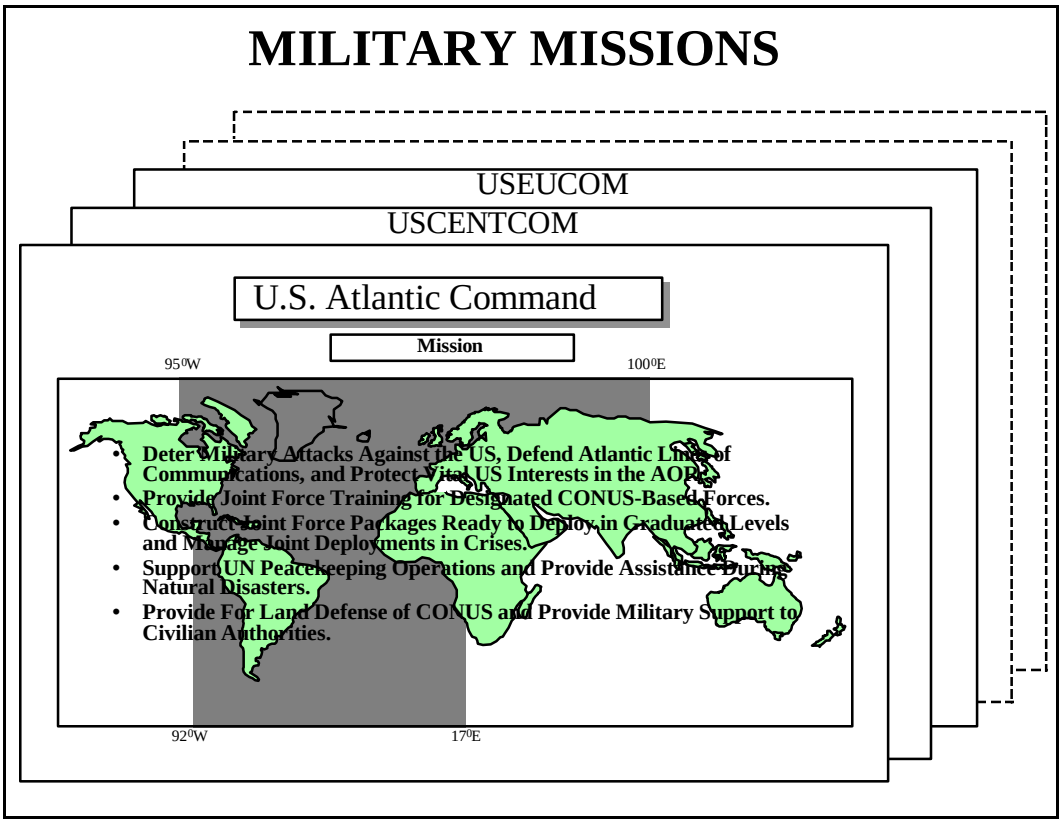


Figure 1-2. CINC Military Missions

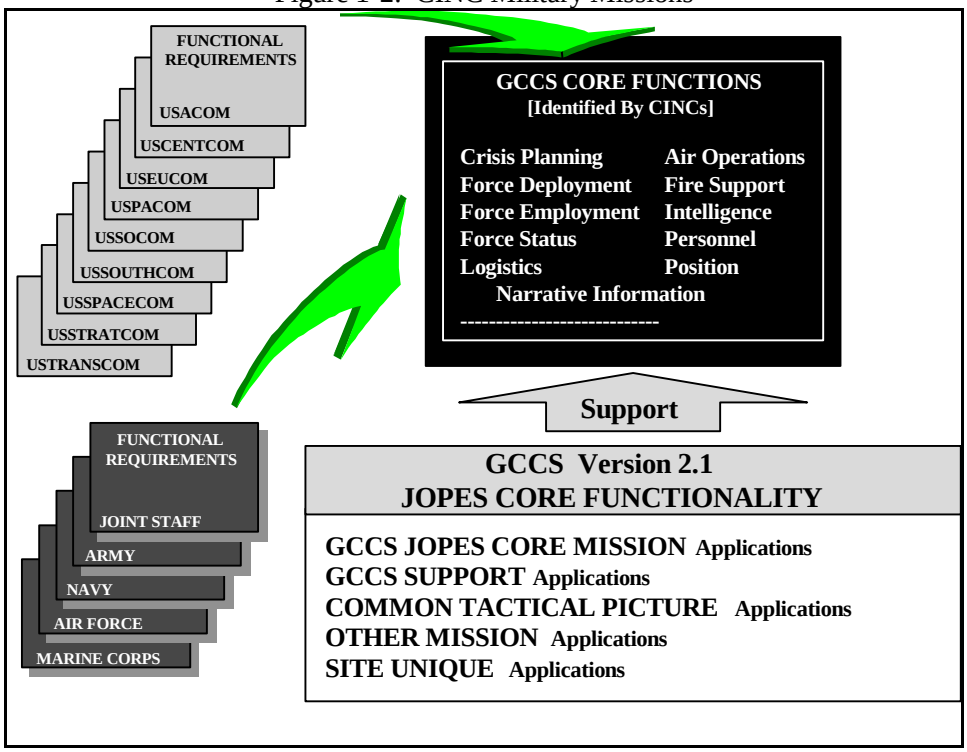


Figure 1-3. GCCS Version 2.1 Support to GCCS Core Functionality

1.3 GCCS Concepts

"At a time when the Warrior's job is likely to be a crisis response in a politically uncertain world, a resolute commitment by the Joint Staff, combatant commanders (CINCs), Services, and Defense agencies to the vision of total joint interoperability provides C^{4}I stability and assurance to the joint Warrior. Even though fewer warfighters and fewer weapons may be available, their most effective use will be realized in joint operations when the vision of C^{4}I for the Warrior has been achieved in the Objective Phase." — Lt. Gen Edmonds as J6, the Joint Staff

This section discusses the basic concepts underlying GCCS. The discussion addresses the need for the GCCS, the goals for its development in supporting the national military strategy, the multiple perspectives of the GCCS, and the impact its fielding is having on joint warfighting. It is important to understand how the GCCS is being integrated into the joint warfighting environment because it is an evolutionary development representing a revolutionary C^{4}I capability.

1.3.1 National Military Strategy and Joint Warfighting. Many factors converged to underscore the need for GCCS. These include: changes in National Military Strategy; operational experience in recent United States military campaigns including Desert Shield/Desert Storm, Grenada, Panama; limitations of aging primary C^{4}I systems; availability of commercial off-the-shelf (COTS) packages and suitable standards; and declining budgets. Post-cold war National Military Strategy presents an array of formidable tasks for the joint warfighter (see Figure 1-4). Modern warfare is extremely quick, precise, and lethal. Recent conflicts have arisen where we least envisioned fighting them and, as demonstrated during Operation Desert Storm, C^{4}I plays an increasingly critical role. For the loser, C^{4}I can be the Achilles' heel.

Figure 1-4. National Military Strategy Objectives—Source: C[4]IFTW Brochure

However, the ascent of joint warfighting and the need to improve it provided the overriding impetus for GCCS development. Jointness is the U.S. warfighting doctrine. The essence of joint warfighting is captured in the words of the former Vice Chairman of the Joint Staff, Admiral Jeremiah.

"No matter where we fight in the future, no matter what the circumstances, we will fight as a joint team. We will have fingers on that team that are individual services, but when it comes to the fight we want the closed, clenched fist of American military power. The days of single service warfare are gone forever."

1.3.2 The C[4]I for the Warrior Concept. The C[4]I For The Warrior (C[4]IFTW) concept is the C[4]I modernization component of joint warfighting improvements (see Figure 1-5). Improving joint warfighting requires changes in C[4]I because functional and physical interoperability problems limit the ability of the combatant commander to forge component forces into an effective joint warfighting machine.

Figure 1-5. Hierarchy of Needs

Total C^4I interoperability is the corner stone of the C^4IFTW concept. Based in warrior requirements and embedded in strategy, policy, and doctrine, C^4IFTW is following a road map to an Objective Phase in which total horizontal and vertical integration of the warfighters will be achieved (see Figure 1-6). The Objective Phase will achieve continuously optimized C^4I support for the joint warfighter. The primary provisions for the Objective Phase are:

- A multifunctional, multimedia terminal fitted to the Warrior's functional manprint.
- A battlespace that provides fused information and a fully integrated tactical picture.
- A seamless, global infosphere.

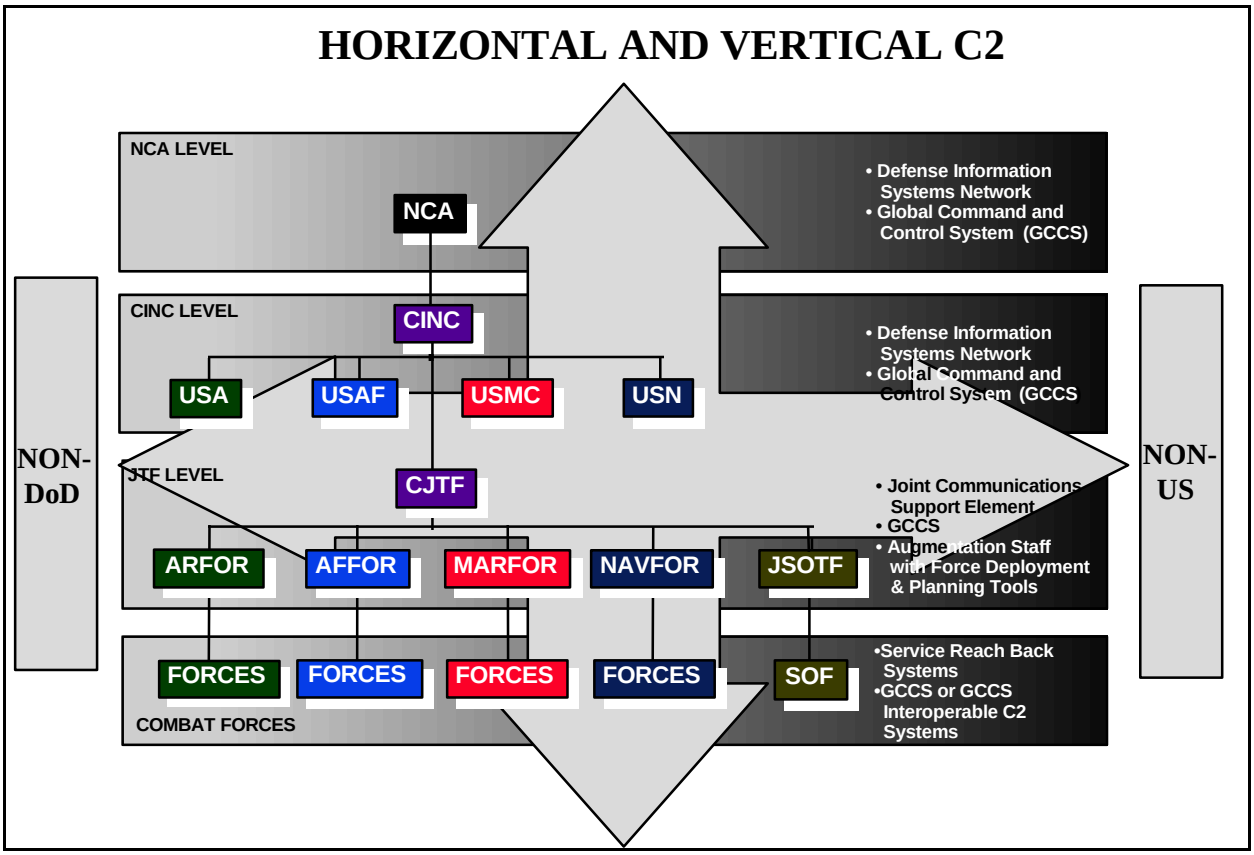


Figure 1-6. Objective Phase Integration

The C^{4}IFTW concept supports the planning, conduct, and maintenance of joint, combined, and unified military operations that extend from the NCA to field tactical warfighters. The concept presents a set of C^{4}I infrastructure needs (shown in Figure 1-5) across all levels of command. These needs are:

- Communications and automated C^{4}I systems to satisfy joint/combined information exchange at all levels.
- Reconfiguration capability.
- Continuous operations in a communications constrained environment.
- Timely information to the warrior on demand.
- Information fusion and storage at all command levels.
- A family of terminal equipment for the joint warfighter.
- End-to-end security.
- Maximum use of automated C^{4}I processes; an optimized set of common procedures and databases.

- Conformance to Open System Interconnection (OSI) reference model and use of national and international standards.

- Ensured interoperability.

1.3.3 The Role of GCCS. GCCS is implementing the backbone of the C^4IFTW concept by fielding a large part of the required C^4I infrastructure. GCCS is a time-phased development of a deployable, highly mobile C^4I system supporting forces in joint and combined operations across the warfighting spectrum. It provides warriors a global, flexible, and interoperable C^2 system. GCCS incorporates the policies, procedures, reporting structures, trained personnel, automated information processing systems, and communications needed for global operations supporting the National Military Strategy. As part of C^4IFTW, GCCS must be standardized, flexible, robust; and it must present a common look and feel while being adaptable to many diverse environments.

As shown in Figure 1-7 part of the operational and business strategy for the development of GCCS calls for the move of C^2 capabilities from WWMCCS to GCCS. WWMCCS is an expensive, proprietary, mainframe-based system that served its purpose during the cold war era. However, it is outmoded and does not provide the agility needed by combatant commanders to fight in the new world environment.

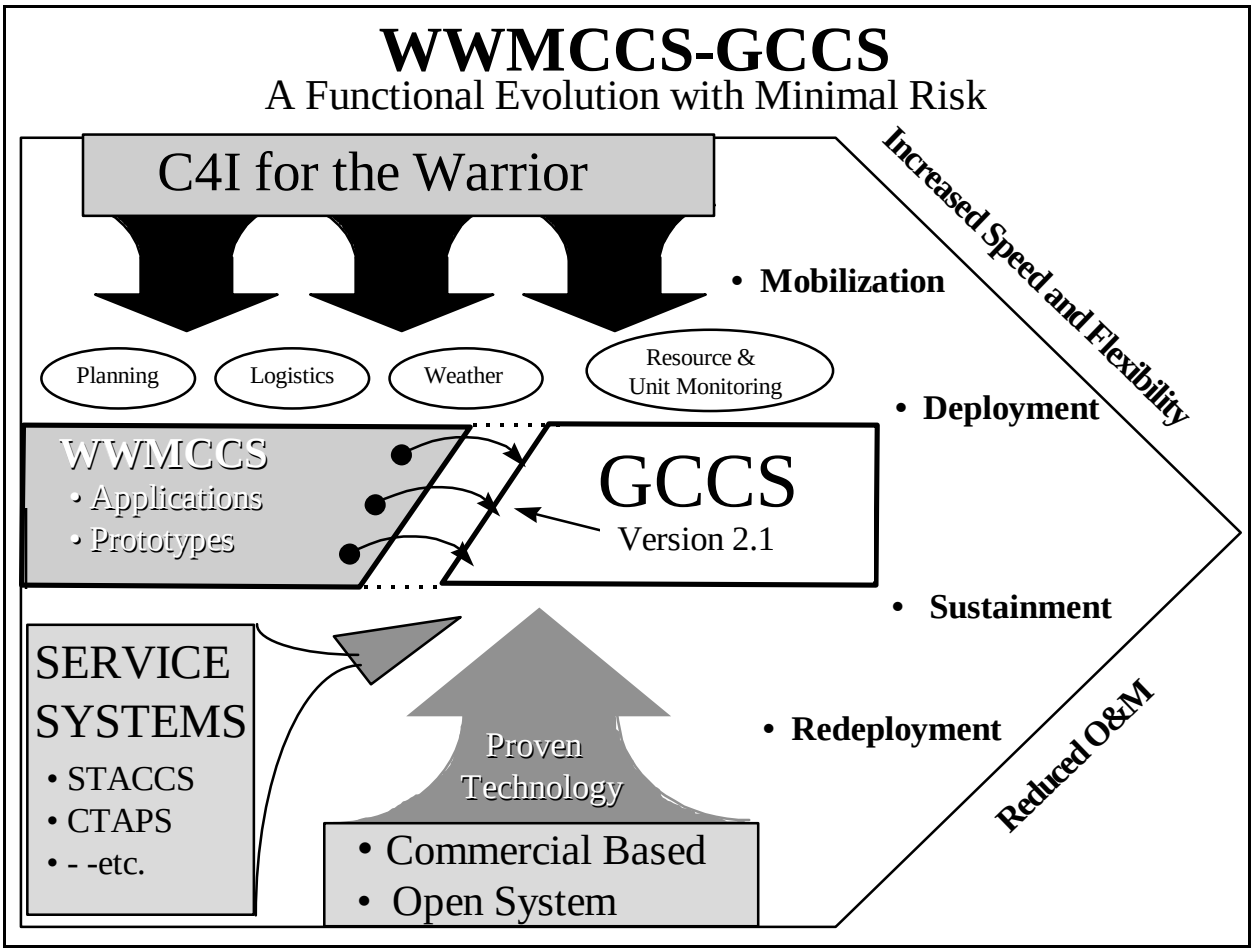


Figure 1-7. WWMCCS to GCCS Transition—Source: C^4IFTW Brochure

GCCS Version 2.1 marks the Initial Operating Capability (IOC) of GCCS. Version 2.1 concentrates on fielding the former WWMCCS C^2 functionality in a modern, distributed-processing system based on an open systems, client/server architecture. This will allow shutting down WWMCCS subsequent to functional experience with, and tuning of, the fielded GCCS Version 2.1. Other basic capabilities will be provided in Version 2.1, such as an office automation suite, e-mail, etc. Basic capabilities (applications) provided in GCCS are fielded in software packages called "segments," which are grouped into "applications" to satisfy user needs. (Applications and segments are defined and discussed in more detail in Sections 3 and 4). This document concentrates on Operations and thus emphasizes those Version 2.1 applications called Mission Area applications. These Mission Area applications being fielded in Version 2.1 are subdivided further for discussion purposes as shown in Table 1-1.

Table 1-1. Version 2.1 Mission Area Applications

Short Name	Title
GCCS JOPES[2] Core Mission Applications	
SMDB	Scheduling and Movement Database (JOPES Core Database)
S&M	Scheduling and Movement
AHQ	Ad Hoc Query
SS	System Services
RDA	Requirements Development and Analysis
JNAV	JOPES Navigation
PDR	Pre-Defined Reports
LOGSAFE	Logistics Sustainment Analysis and Feasibility Estimator
MEPES	Medical Planning and Execution System
JEPES	Joint Engineer Planning and Execution System
JFAST	Joint Flow and Analysis System for Transportation
DART[3]	Dynamic Analysis and Replanning Tool
GCCS Support Applications	
AMHS	Automated Message Handling System
APPLIXware	APPLIXware Office Automation Software

[2] The Joint Operations Planning and Execution System (JOPES) Application, Force Augmentation Planning and Execution System (FAPES), is not included in GCCS Version 2.1.

[3] Dynamic Analysis and Replanning Tool (DART) is shown here under JOPES because it is a prototype system that will eventually be replaced by the functionality in the JOPES RDA Application.

Table 1-1. Version 2.1 Mission Area Applications (cont.)

Short Name	Title
CCAPPS	Command Center Applications
Teleconferencing	IRC, NewsGroups, Netscape, Netsite
ESI	External System Interface
IMS/RFM	Information Management System/Reference File Manager
Airfields	Airfields
TARGET	Theater Analysis and Replanning Graphical Execution Toolkit
GTN	Global Transportation Network
Common Tactical Picture Applications	
JMCIS	Joint Maritime Command Information System
Other Mission Applications	
GSORTS	GCCS Status of Resources and Training System
GARC	GCCS Air Tasking Order Review Capability
JDISS	Joint Deployable Intelligence Support System
RUDRS	Reserve Unit Data Resource System
Site Unique Applications	
GRIS	GCCS Reconnaissance Information System
EVAC	Evacuation System
FRAS	Fuel Resource and Allocation System

1.3.4 Multiple Perspectives of GCCS. It is helpful to discuss GCCS in terms of a multiple perspective concept. Much of the terminology used in the program overlaps operational, C^4I, and technical domains and sometimes causes confusion. For example, consider the three definitions below for the Common Operating Environment (COE):

"The common operating environment provides a familiar 'look, touch, sound and feel' of the C^4I environment to the Warrior, no matter where the warrior is deployed. Information presentation and C^4I system interfaces are maintained consistently from platform to platform, enabling the Warrior to focus attention on the crisis at hand." — C^4I For The Warrior Objective Concept.

"A Common Operating Environment that provides an approved set of standards that defines the interfaces, services, protocols, and supporting formats required for application portability profiles."

— C^4I for The Warrior Brochure.

"The infrastructure, core software, APIs, run-time environment definition, and methodology required to build a Command Information System. The COE allows segments created by separate developers to function together as an integrated tool." — GCCS Integration Standard.

Each definition is correct but each stresses different perspectives of the system. The first represents the standardized "feel" of the system to the warfighter, and some aspects of the other two views. The second stresses the view of the C^4I operator, the standards, protocols, interface necessary to operate the system, with some flavor of the technical perspective. The third is a formal definition from the technical domain, pertaining to the software side of the system. Each of these definitions is embodied in the system and intersect. The first definition, for example, is only enabled if the second and third definitions are enacted.

The following sections briefly discuss the three primary perspectives of the GCCS and why they are important in a distributed processing environment. The three perspectives are:

- The warfighter.
- The GCCS C^4I system operator.
- The technical system developers and maintainers (see Figure 1-8).

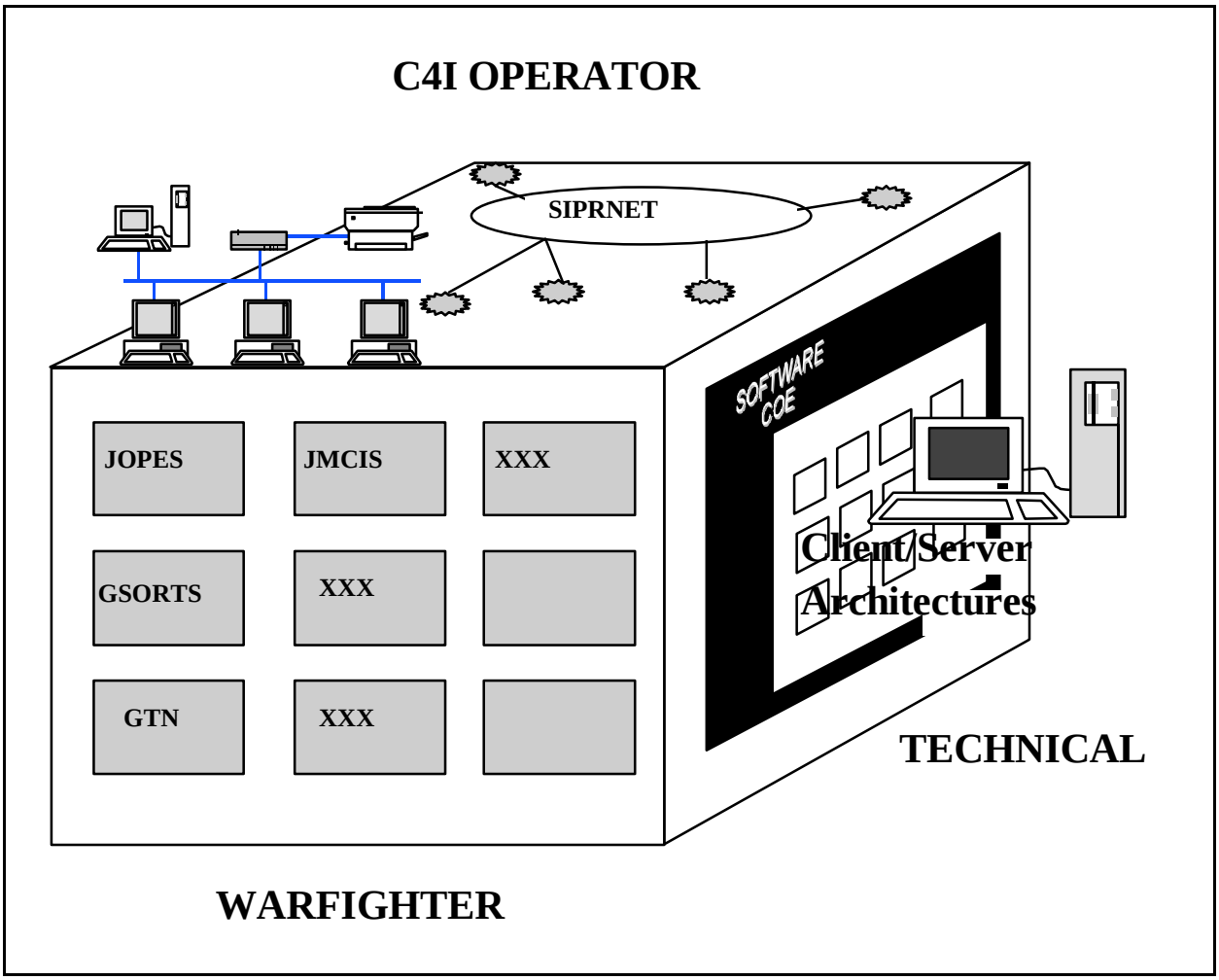


Figure 1-8. Multiple Perspectives of GCCS

The warfighter primarily sees the mission applications (JOPES, GCCS Status of Resources and Training System [GSORTS], Joint Maritime Command Information System [JMCIS], etc.) and is comfortable with that sense of a COE. The GCCS C^4I system operators perceive the system in terms of its C^4I functional capabilities and interfaces (the Secret Internet Protocol Router Network [SIPRNET], site database back-up requirements, etc). The technical personnel see the software COE backplane, hardware interfaces, client/server architecture, etc. Each of the three groups need to understand a substantial portion of the other two perspectives. The network is now the computer.

1.3.4.1 The Warfighter. The warfighter perceives the system primarily in terms of the operational capabilities used to perform the mission at hand. These are embodied primarily in the Mission Area Applications, which are listed in Table 1-1 and shown in Figure 1-9. The term "mission area applications" is derived form the Department of Defense (DoD) Technical Architecture Framework for Information Management (TAFIM), which is the basis for the GCCS design. Mission area, in this sense, means an operational mission area, broken into operational functions, which also include the information services needed for the mission concerned.

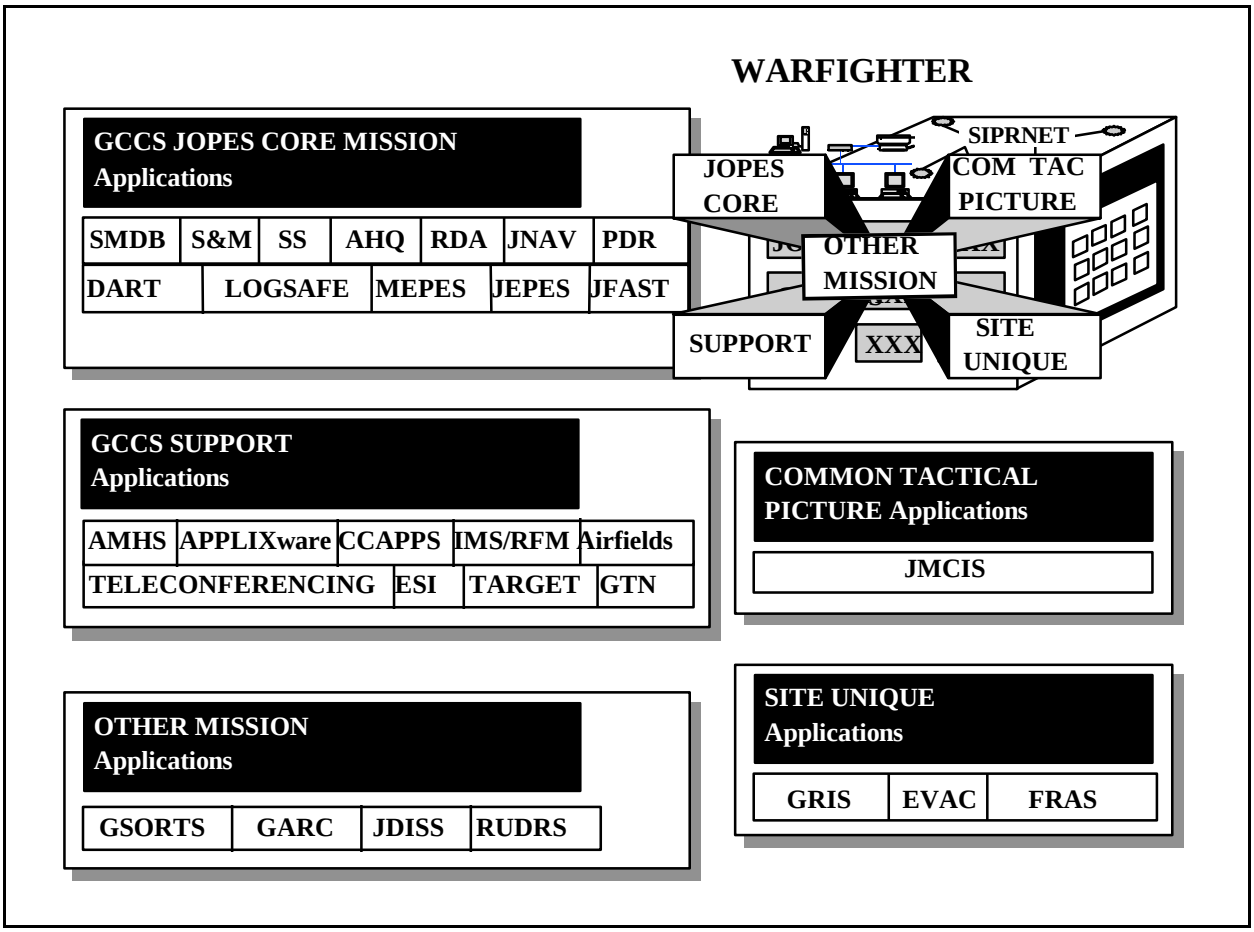


Figure 1-9. The Warfighter Perspective

In reality, the warfighter will use whichever parts of the system are necessary to achieve the mission. Other capabilities not shown here, but discussed in other sections, may prove equally critical during actual operations, or may provide the foundation underpinning the applications in Figure 1-9. There are no "fixed," inflexible filters limiting the warfighter. Some applications may look and feel like WWMCCS, but they are not WWMCCS. It is the warfighter's responsibility to understand and optimize the system to exploit its maximum warfighting capabilities during crisis response.

1.3.4.2 The C^{4}I Operator. The C^{4}I operator perceives GCCS primarily as a system of interacting, integrated information and communications elements (see Figure 1-10). The C^{4}I operator must be able to manipulate the component systems to sustain and optimize GCCS capabilities for the warfighters. This includes general, routine operation and maintenance of hardware and software, including maintaining standards, documentation, Local Area Network (LAN) operation, trouble reporting, interfacing to other systems, recovery and back-up procedures, and communications. In short, all aspects of a global C^{4}I system. This is a formidable task not to be underestimated by C^{4}I personnel. C^{4}I personnel must be able to optimize the system for maximum effectiveness and to rapidly reconfigure the system locally and as part of the global network. C^{4}I operators help to bridge the gap between the warfighter and technical domains.

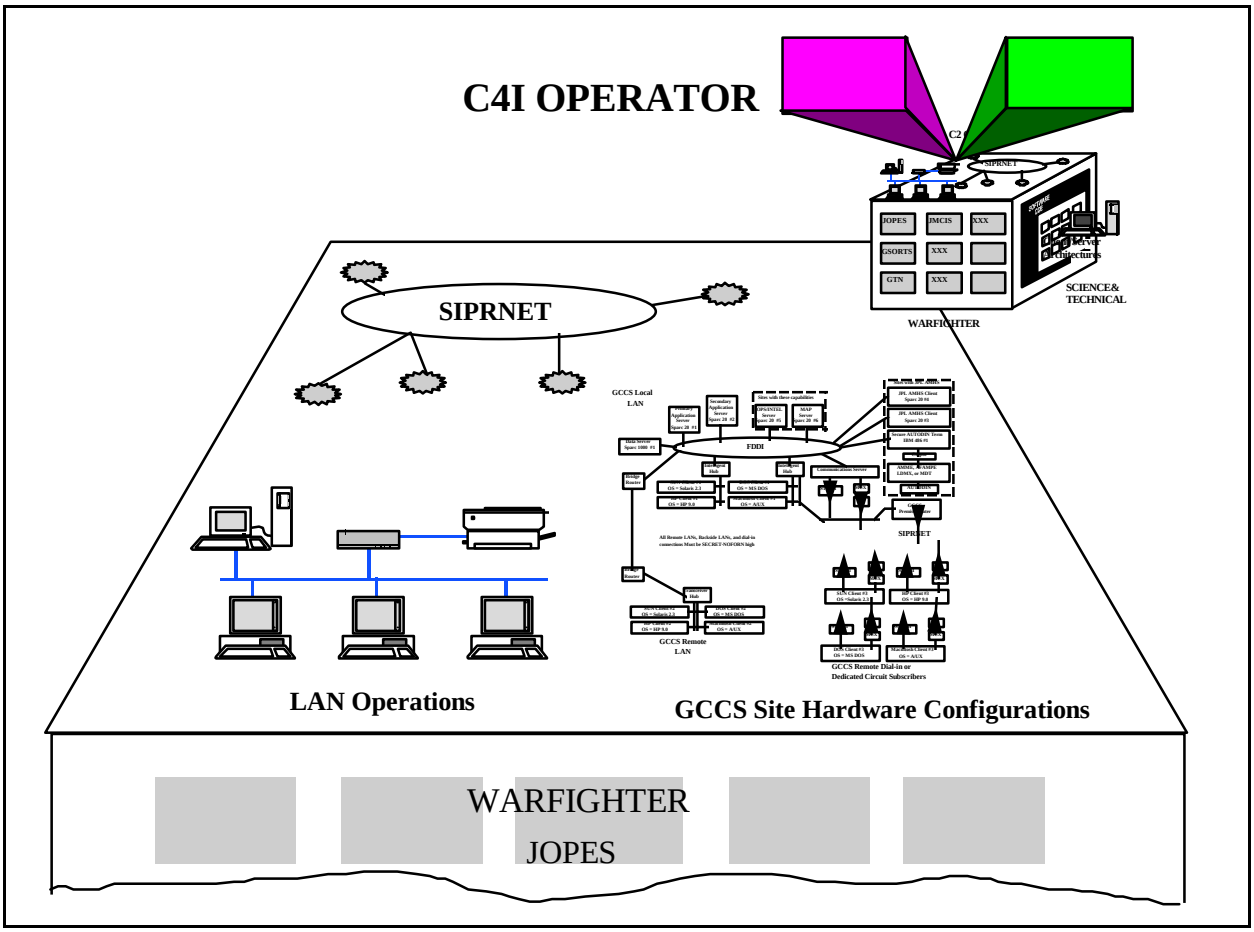


Figure 1-10. The C[4]I Operator Perspective

1.3.4.3 The Technical Perspective. Technical personnel include the computer scientists, engineers, and technicians who design, build, integrate, test, field, maintain, and update the system. The technical perspective is one of formal definitions, and the development of hardware and software in an Open Systems Environment so as to meet user requirements, allowing easy upgrade and support. Interoperability is built into the design. The technical personnel must understand the other two perspectives, in detail, to field a C[4]I infrastructure that meets the warfighter's requirements. The technical perspective deals with the software design and the COE, the client/server environment, and implementation of the operational requirements in hardware and software as shown in Figure 1-11.

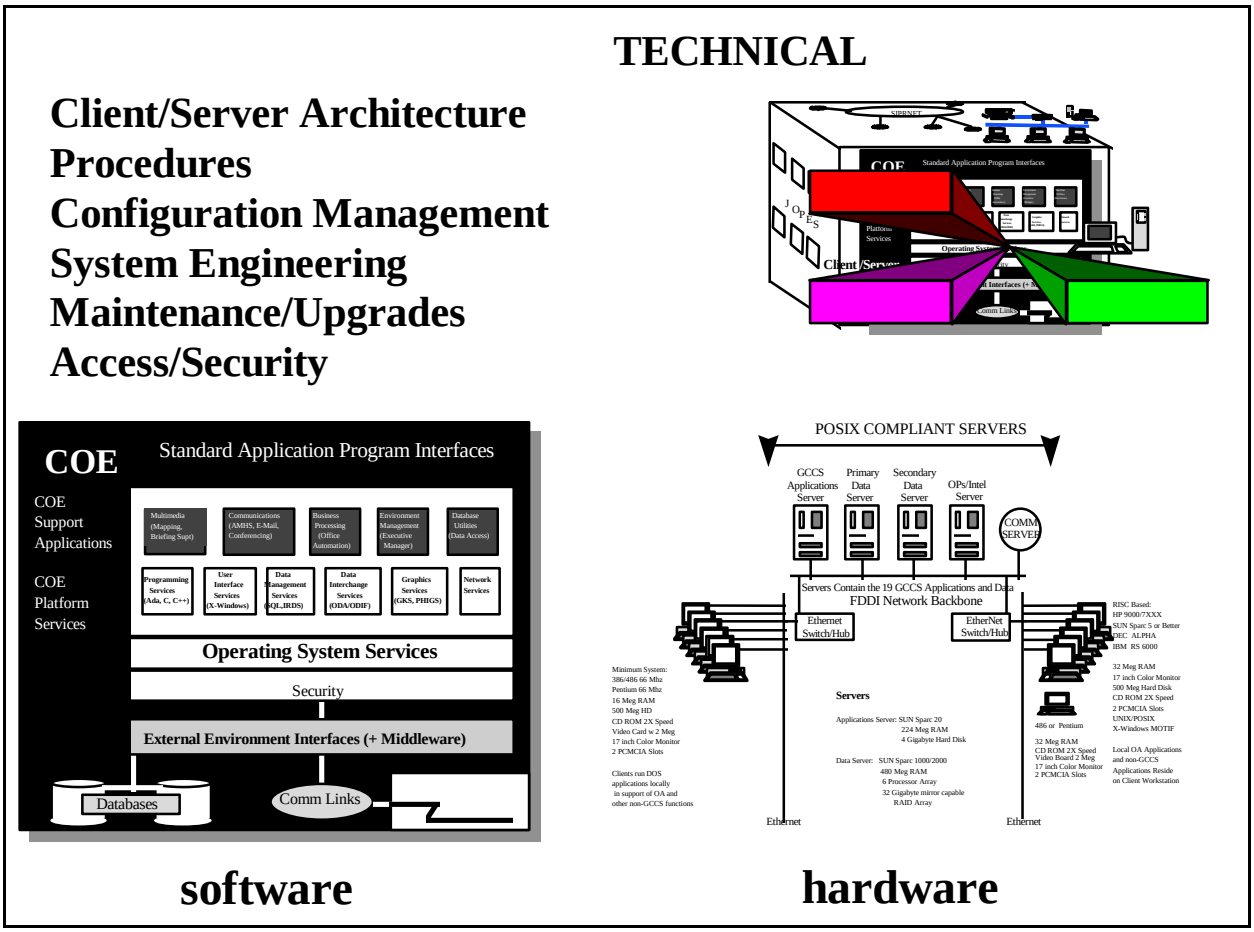


Figure 1-11. The Technical Perspective

1.3.5 GCCS Concept Summary. The perspectives discussed in this Section are no different than those of a weapon system. For example, consider the role of the pilot, the crew chief, and the aircraft designer for a fighter aircraft. Each has a primary perspective and they are highly interdependent. GCCS, in the hands of skilled personnel, is evolving into an important weapon system in the Information War. It will expose the enemies' Achilles heel and allow the U.S. warfighter to constantly interdict and remain inside the enemy decision and execution cycles. This document provides an overview of the GCCS Version 2.1 capabilities provided to the warfighter in terms of the three primary perspectives. Sections 3 and 4 provide an overview of GCCS applications and infrastructure while Sections 5 through 10 focus on system utilization. Detailed information can be found in other documents such as user manuals, COTS documentation, hardware and software manuals, and local site Standard Operating Procedures (SOPs).